

Response of the Department of Computer Science
at
Jerusalem College of Technology (JCT)
to the
Evaluation Report of the Committee for the Evaluation of Computer Science
Study Programs, October 2013

Distinguished members of the Evaluation Committee,

Thank you very much for your thorough evaluation and recommendations. We have read the report very carefully and the following is our response to your recommendations.

1. The JCT administration is well aware of the problems created by inter-campus travel. We have worked hard to organize the time table to minimize this problem. This did not completely solve the problem, and during the 2012 academic year we established a shuttle service between the campuses. This improved the situation; however it was not completely satisfactory. Beginning with the 2013 academic year, we decided that faculty members commuting between the various campuses in Jerusalem receive taxi vouchers, whereas faculty commuting between cities receives a flat fee to reimburse them for their travel expenses. This has reduced the inter-campus travel burden on the teaching staff tremendously.
2. JCT is not a typical Israeli college whose primary mission is education and in which research has little if any role. Unlike many of the other colleges in Israel, since its inception, JCT has been one of four institutions of higher education that are a kind of combination of a university and a college. JCT's mission is a mixture of the mission of a research institution like Caltech, USA – to expand human knowledge and benefit society through research integrated with education – and that of a teaching institution like Harvey Mudd College, USA – to educate engineers, scientists and mathematicians well versed in all these areas. Apart from a few members of the department who conduct pure educational research especially in the use of educational technology, most members of the department focus their research in the field of computer science. To say that this research may not contribute “directly” to the college's primary mission of education is a mistake. By keeping active in research, our faculty is better able to keep abreast of developments in the field.

If our faculty were not up to date, the education we provide would be deficient. The promotions committee takes into account both teaching performance and research. Promotions are made into two tracks: the academic track (more research oriented) and the teaching track (more teaching oriented). No faculty member is promoted without a proven track record as a good educator. Annual surveys of student evaluations take place; a member of the office of quality of teaching in the Rector's office often attends classes to evaluate the teaching performance of faculty members

and that office conducts periodic mini-symposia and workshops to improve the quality of teaching at JCT.

3. The department checks the syllabi of all the courses annually. As noted in Section 2.3.4 of the Self-evaluation Report, following the initiative of the Rector, each course has a coordinator, and for each group of courses there exists an internal committee of the department that tracks the content of the courses. Furthermore, in the 2013 academic year, a departmental steering committee comprised of people from academia and industry and headed by Dr. Jacob Stein was established. Dr. Stein is a scholar and a senior consultant in the industry. The role of the committee is to:
 - Review the existing program.
 - Review, in cooperation with the chairpersons of the internal committees, all the syllabi of the courses and recommend changes if necessary.
 - Recommend future directions for the development of the department.
 - Update the chairperson regarding directions of development and new trends in industry.

4. We are in full agreement with this recommendation. We hope that the various budget committees of the Council of Higher Education (CHE) understand the importance of this recommendation and will agree to provide JCT (and others) with the necessary funds to support this. Nevertheless, the Department encourages its members to continue further studies and develop in the field of computer science. The tenured members of the faculty enjoy the benefits of the Professional Development Program and Sabbaticals. Others, albeit on a smaller scale, are also given some financial support to participate in conferences, local and overseas. We wish to point out that seven junior faculty are graduate- or PhD students in computer science. In the 2013 academic year, another three junior faculty participated in a training course to develop a new workshop in programming cellular systems. In the 2014 academic year, these instructors will train their fellow instructors in order to prepare them to conduct such a workshop. This study was fully funded by JCT. Most of the other instructors who are employed on a per hour basis (some of whom were not present during the committees visit) are teaching while completing their graduate studies at various universities. In summary, as pointed out above, a vigorous program of professional development, both technical and pedagogical, can be attained only if the budgeting committee of the CHE funds it in an appropriate manner. We acknowledge the importance and are doing the best we can within the available resources.

5. As mentioned above, promotions are based on both professional performance and quality of teaching. The same is true regarding the renewal of contracts. The appointments and promotions committee carefully examines the participation of each faculty member in professional development.

6. On page 10 of the Evaluation Report it says: “the committee was **appalled** to discover that a department close to 1500 students and multiple campuses has only one secretary”. First of all, page 22 of the Self-evaluation report shows only 916 students (not 1500) in the Department. Secondly, while under normal circumstances even this number of students warrants more secretarial/administrative staff, within the system at JCT, however, the departmental secretary does not perform all the administrative duties in the Department. For example, she is not involved in the scheduling, preparation of the time-table, entering of students’ grades, appeals, etc. Most of these matters are fully computerized. Moreover, there are secretaries on each campus who help deal with student problems on that campus; there are also academic student advisors on each campus, etc. We therefore acknowledge that while the level of secretarial support is not as high as we would like, it is not a basis for being “appalled”. Nevertheless, we have requested additional secretarial assistance for the 2014 academic year, should the budget allow it.
7. Currently, the department has 26 qualified regular faculty members (21 whose training is in computers, 4 in mathematics, 1 in physics) not including external lecturers and junior faculty members. The CHE recommends that the faculty-student ratio be 1:50. To the best of our knowledge, this is also the budgeting index of CHE. After a very detailed check, the number of students in the Department has increased during the 2012-2013 academic year to 1074 students. Even if one considers this number (and not the 916 given in the Self-evaluation report), the faculty-student ratio in the Department is 1:43. This is well within the CHE 1:50 recommendation. Notwithstanding this, because of the importance of the quality of teaching, the Rector's office schedules various courses in the department where the participants are divided into small tutorial, practice and laboratory groups. The existing budgeting did not allow us to employ additional full-time faculty, and this is why we employ adjunct faculty. We feel that this does not greatly affect the quality of teaching and the academic level of the faculty. Most of our adjuncts are employed in universities and other colleges or come from industry and contribute their practical knowledge. We plan to expand the regular faculty body in the department as well, as will be allowed by budgetary considerations.
8. At the end of the 2012 academic year, JCT opened an office whose role is to build a computerized system for tracking our graduates. This system will allow us to track the feedback of students following job interviews, feedback from the army about the integration of computer science graduates and Atudaim (ASTPR) in the various departments of the army, jobs held by our graduates, employers impressions of those of our graduates employed by them, reports from graduates pursuing higher degrees, and will allow us to remain connected to our graduates and help us make use of their experience to improve the department.
9. As indicated in Section 2.2 of the self-evaluation report, JCT’s goal in general, and the Department of Computer Science’s goal in particular, is to prepare students for

the high-tech industry and/or graduate programs in computer science. We believe that the department does a good job of meeting these criteria. The percentage of students who seek employment is close to 100%. Approximately 9% of our graduates continue their education by studying for advanced degrees in universities. To meet this mission, the department provides high quality courses and has faculty members carrying out state-of-the-art research. The quality of the teaching of the vast majority of our lecturers – according to surveys conducted by the Office of the Rector in cooperation with the Department of Teaching – is very good, both according to the students and according to the results of work done by JCT's Center of Teaching, headed by Dr. Isaak. This Center also conducts seminars on teaching quality for the JCT's lecturers.

An excellent computer scientist is one who is broadly knowledgeable about computer science and who helps improve society's knowledge of computer science; s/he is a researcher. The computer science department encourages its faculty to conduct publishable research in computer science and allied fields. The Rector's Office also encourages this and makes it a priority in decisions about promotion and tenure.

JCT encourages research by helping fund it with modest internal grants and by reducing the number of hours an active researcher must teach. Unfortunately, we cannot afford the required financial support for most lecturers to attend scientific conferences and seminars in Israel and abroad. We think that indeed both the quality and quantity of research by the department staff speak for themselves. A significant fraction of the lecturers in the Department conduct research and publish in leading journals and conference proceedings.

Unlike the universities, where research teams are predominantly made up of graduate students and postdoctoral fellows, allowing a researcher to leverage his/her expertise and perform larger scale studies than s/he would be able to perform alone, this is not the case in the colleges. The CHE does not generally allow colleges to open postgraduate courses that have a serious research component – i.e. advanced degrees with a thesis. In fact, what happens in many cases is that the quality of a study published by a researcher in JCT is very much on par with that of his counterpart from the university. This happens because the researcher in JCT is directly responsible for the study, without relying on graduate students.

We request that the Committee approach the appropriate institutions in CHE and recommend that they increase their support for scientific research in the departments of computer science at JCT and other colleges that conduct quality research, by appropriately funding both research and researchers. This is the only way to maintain the academic level of the lecturers, and the quality of the instruction the students receive.

Few of the lecturers in the Department have significant background in the area of computer science education. To perform research in this area, the lecturer has to start learning a domain of knowledge which is far from the field of his expertise. To transform this new knowledge into meaningful results will take several precious years. Perhaps if the researcher had the possibility of using graduate students to reduce the "burden" of completely single-handed research (as he can in the universities), he could possibly move some of his research efforts to the field of pedagogy, but in the current situation, we believe that it is far better for him to perform research in his field of specialization.

Another important point: when the appointments and promotions committee discusses the promotion of a staff member to associate or full professor, whether at the internal institutional level or the level of the CHE's committees, the considerations related to research generally focus on research in the classical areas of computer science. Even inter-disciplinary studies that are not directly related to computer science, such as neuroscience or computational chemistry, are not viewed favorably by these committees.

10. This has been done. One of the functions of the Steering Committee is to address these points. Some weaknesses identified in the self-evaluation report such as strengthening the Information and Communications Technology (ICT) and administrative infrastructure in the various institutes, encouraging and rewarding research, placing students in industry and following them over the years, and the expansion of various tracks in the department's courses of study, have already been discussed and practical steps taken to improve them. Within approximately one year, we intend to address all the weaknesses that were pointed out in the self-evaluation report.
11. As indicated in Section 7 above, the current student to faculty ratio is 43:1. Within 4 years, this ratio will be further reduced to, at most, the 40:1 level recommended by the Committee.
12. In the near future, we intend to improve the computer science department's faculty offices. With the occupancy of the new Beren building (in December, 2013), we will change the allocation of offices, which will greatly improve the situation of the faculty of the computer science department. Concerning the Tal campus, the question of how to add rooms for the faculty must be seriously considered. Since the Tal campus is rented, there is some difficulty in the allocation office space. Nevertheless, we will make every possible effort to improve the conditions of the academic staff.
13. JCT started integrating high school students into the academy before other academic institutions. Ultimately, the CHE also recognized the importance of this type of project, as documented in the Liebman Report prepared by CHE. We would like to highlight a number of facts related to this project.

- Interested high school students take a test developed and designed by the Ministry of Education to detect gifted students, and only the top 5% are considered.
- The frameworks are nationwide, and the students come from all over the country and not just from Jerusalem.
- The students are enrolled in one of two high schools: Yeshiva Tora-Umada (boys) or Ulpanat Talia (girls). All the students are under the supervision of an educational consultant and a psychologist.
- Those who are familiar with the religious community know that due to the educational-religious nature of these students, only institutions like Yeshiva Torah-Umada and Ulpanat Talia are able to provide these students with the opportunity to realize their potential. These students' families will not send their children to other programs of higher education (college or university). So, if they want to allow the realization of their potential they must work within these frameworks provided by JCT.
- At JCT, we have graduated three sets of students from within this framework. Thirty-four percent of the graduates finished with an average over 90. This constitutes 93% of all the students with an average over 90 in the Department. Another 44% finished with an average of over 85, and another 19% with an average over 80. We think that **these results speak for themselves!** In addition, please note that different divisions of the army "compete" for these graduates due to their extraordinarily high caliber.
- All in all, the program, as it is, is very successful and fully implements the recommendations of the Liebman Committee of the CHE.
- Finally, we wish to point out **some** of the **National and International Prizes** received by these students:
 - 2009, Microsoft/ACM International Best Student Competition, New York, USA-First Prize.
 - 2010, International Young Scientists Competition, China - Gold Medal.
 - 2010, UIST Student Innovation Contest, New York, USA - First Prize (Most useful project category).
 - 2010, International Water Youth Competition, Stockholm, Sweden - Top Five.
 - 2011, European Union Young Scientists and Innovators Competition, Helsinki, Finland - INTEL Prize for Technological Excellence in Computer Science.
 - 2012, INTEL/ISEF Competition for Young Scientists and Innovators, Pittsburgh, USA - Third Prize (Water Technology).
 - 2010, National Water Youth Competition, Tel Aviv, Israel-First Prize.

14. We are aware of this problematic situation. Some things have been solved, and all the other problems already have a solution as described below. The most difficult situation was in our Tal and Lustig campuses, so we focused on them first. At Tal,

the activity is almost over, and at Lustig, the process is in progress.

Problems that have been solved:

- Significantly increasing of the bandwidth of the outgoing internet lines from the institute and between the various campuses.
- Communication infrastructure at Tal (switches, cables, communication lines) was upgraded with modern and fast infrastructure.
- Monitoring software and methods of controlling the communication mode were installed on all campuses (integration in process).
- Computer labs on all campuses were upgraded with modern computers and large screens. Problematic points of communication were fixed and the cables were rearranged to improve the appearance of the labs. New laboratories were added.
- Problems with printers were fixed, in particular at Tal and Lustig, and monitoring and remote control systems for the printers on all the campuses were installed.
- Wireless network coverage was expanded at Tal and Lev.
- Wireless internet was installed in the dorms at Tal.
- The support center at Tal and Lustig is being upgraded so it will be able to support remote computing equipment (in progress).
- Antivirus McAfee was installed including overall management system of all computers at the labs.

Projects in process (should be completed within one year):

- Upgrading communications infrastructure at Lustig with new and fast infrastructure – the process will be complete by January.
- Upgrading communications infrastructure at Lev with new and fast infrastructure – should be finished in six months.
- Implementing a command and control system for servers and podiums – at this time the system is being selected.
- Upgrading the information security system both as it pertains to computers within JCT and computers external to JCT – the rebuilding of the rules used in the firewall, migrating to a better network topology – the process is being analyzed and a requirements document is being prepared.
- Simplify the network – Rebuilding the identification system (Active directory) – the process is being analyzed and a requirements document is being drawn up.
- Installing a modern and stable connection system from home (JUNIPER) - will be fully in place the coming months.
- Mapping wireless reception levels on all the campuses and assuring reception in all problematic areas.
- Upgrading the storage and backup (NETAPP) system - will finish within 3 months.